

Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project at Naturita, Colorado

This fact sheet provides information about the UMTRA Ground Water Project site located at Naturita, Colorado. The U.S. Department of Energy Grand Junction Office in Grand Junction, Colorado, manages the UMTRA Ground Water Project.

Site Description and History

The Naturita UMTRA Ground Water Project site is a former uranium and vanadium ore-processing facility located in western Colorado, about 2 miles northwest of the city of Naturita, in Montrose County, Colorado (Figure 1). The site is situated on an elongate north-south section of floodplain bounded by the San Miguel River on the east and Highway 141 on the west. The current site area is 79 acres; the City of Naturita owns the central portion of the site and Chemetall Foote Corporation, a German company, owns the northern and southern parts of the site (Figure 2).

Rare Metals Company built the Naturita vanadium mill in about 1930 with a loan from the Vanadium Corporation of America. When Rare Metals failed in the mid-1930s, Vanadium Corporation of America foreclosed, performed improvements, and reopened the mill in 1939 to process vanadium. In 1942, the operations were altered to include recovery of uranium for the Manhattan Engineer District project (the Manhattan Project). The mill continued to process uranium and vanadium ores until it closed in 1958 when its contract with the U.S. Atomic Energy Commission expired. During the life of the mill, approximately 704,000 tons of ore was processed from the Uravan Mineral Belt.

In fall 1969, Foote Mineral and the Colorado Department of Health tried to stabilize the tailings that were adjacent to the San Miguel River by covering them with topsoil, seeding and fertilizing that area, and watering the surface to promote seed germination and plant growth. This stabilization met with only limited success.

By the 1970s, the price of uranium was attractive again. In 1975, Foote Mineral leased a part of the millsite to the nuclear division of General Electric as a buying station for uranium ore and purchasing of ore at this site continued into the 1980s. In 1976, the Ranchers Exploration and Development Corporation purchased 24 acres of tailings located on the site and removed an estimated 360,000 tons of tailings to a new location 4 miles to the south near Dry Creek. In 1978, Vanadium Corporation of America (VCA) merged with Foote

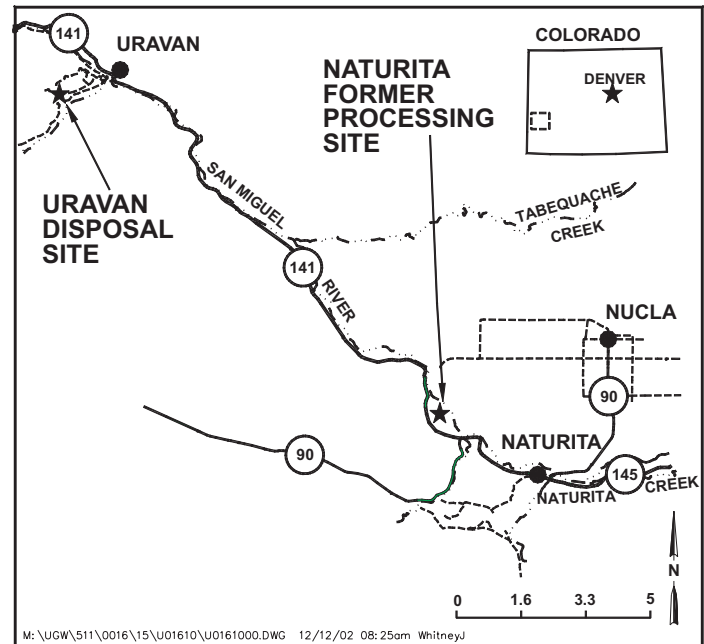


Figure 1. Location of Naturita
UMTRA Ground Water Project Site

Mineral, and the downsizing of all former VCA operations accelerated. Chemetall Corporation later acquired Foote Mineral to become Chemetall Foote Corporation.

In 1981, an engineering assessment of the site was performed for the U.S. Department of Energy (DOE). Additional evaluations were performed in 1984 and 1985. This information was used to plan the remedial action for the site. DOE began removal and relocation of all remaining radioactive material to an engineered disposal cell at Uravan, Colorado, in 1993 under the UMTRA Surface Project. Surface remediation was completed in 1997.

According to federal regulations established in the Uranium Mill Tailings Radiation Control Act (42 *United States Code* 7901 *et seq.*) and the U.S. Environmental Protection Agency's (EPA's) standard set forth in Title 40, *Code of Federal Regulations*, Part 192, ground water in the uppermost aquifer at the respective sites must be cleaned up to the applicable standards. At the Naturita site, the alluvial aquifer is the uppermost aquifer. Alluvium is a general term for clay, silt, sand,

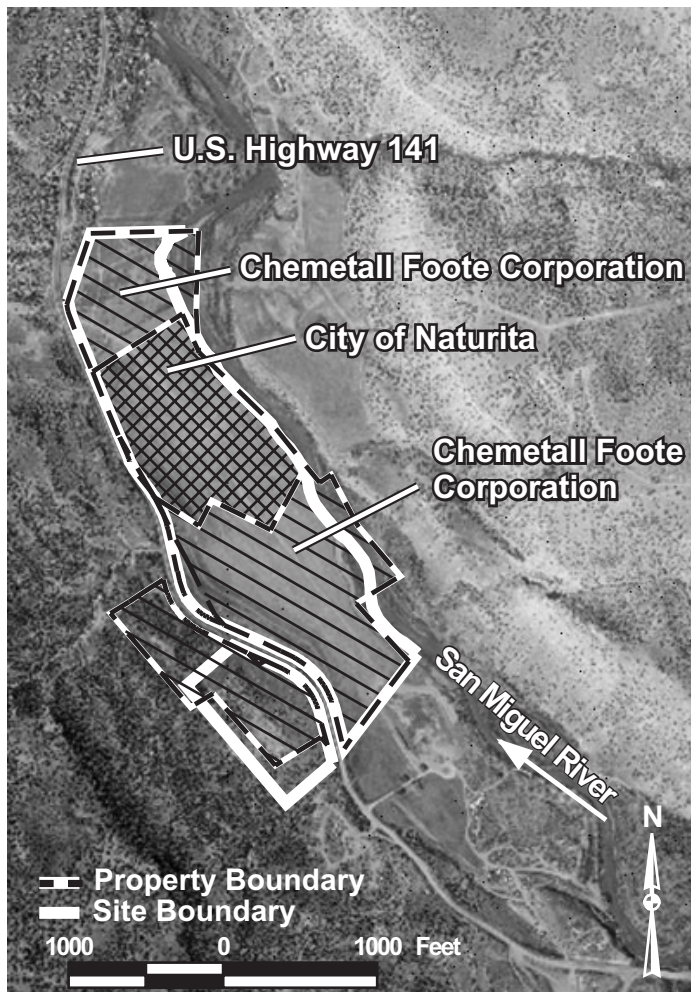


Figure 2. Ownership of Naturita
UMTRA Ground Water Project Site

gravel, or similar unconsolidated material that has been deposited during comparatively recent geologic time by a stream or other body of running water.

DOE began collecting data about ground water contamination at the site during the UMTRA Surface Project. DOE worked with the U.S. Geological Survey to collect and evaluate analytical data for ground water samples from an additional 23 monitor wells and 16 surface locations during 2000 and 2001. Interpretation of analytical results indicates that uranium and vanadium contamination is of potential concern.

Contamination of the ground water in the uppermost aquifer (which is shallow and thin) is most likely a result of the millions of gallons of water used in the milling process that has seeped into the ground. The most contaminated ground water at the site is below the former tailings pile that was located at the north end of the site. The bedrock below the alluvial aquifer contains mudstones and claystones that create an effective barrier for downward migration of contamination.

The San Miguel River is the dominant source of surface water at the site. In areas where the alluvial

aquifer drains into the San Miguel River, the 4,000- to 5,000-fold dilution rate eliminates health risks to humans, animals, or birds that may come into contact with the water.

Currently, there are no uses for ground water at the site. The ground water in the alluvial aquifer is of poorer quality than water from the San Miguel River flowing adjacent to the site. Livestock drink from the river. No domestic wells exist in the contaminated portion of the aquifer.

The population of Naturita is approximately 635. Ranching and farming are the main occupations in the valley around the former millsite. The former millsite and the surrounding land are both zoned agricultural. The City of Naturita identifies the land within the former millsite as having possible uses as a western park or golf course.

Targeted Compliance Strategy

Ground water modeling predicts 135 years for the uranium to flush to maximum concentration limits (0.044 milligram per liter [mg/L]). Modeling also predicts that vanadium will require more than 1,000 years to flush to 0.33 mg/L, a human health-based risk concentration.

Characteristically, vanadium attaches itself to clay particles and rock grains and is not removed by ground water flow. In this case, research shows that the vanadium has not moved much from its original position below the former tailings pile during the past 40 years. Although uranium does move in water, the levels of contamination do not allow it to disperse down to the maximum concentration limit within the 100-year timeframe allowed by regulations. The most reasonable cleanup strategy determined for the Naturita site is no ground water remediation and application of alternate concentration limits. This strategy is based on an evaluation of the cost of removing the contaminants, the potential danger to workers, and possible excessive harm to the environment. The purpose of the compliance strategy is to ensure the protection of human health and the environment at the location where the ground water may surface.

The targeted strategy entails setting a different concentration limit within the area of the site. This concentration must not allow contamination in ground water to exceed maximum concentration limits or health-based standards if the ground water surfaces and is available to people or animals. This compliance strategy will be implemented in conjunction with institutional controls to limit ground water use. Ground water samples will continue to be analyzed to determine the effectiveness of the strategy.

Institutional Controls

Institutional controls are “checks and balances” that effectively protect public health and the environment. Typically, institutional controls depend on some legal order such as zoning ordinances and laws to ensure that protection is effective. EPA standards permit the use of institutional controls at sites where “passive remediation” can occur through natural flushing of the aquifer within 100 years. Institutional controls may also be used to protect public health or the environment if at any time during the cleanup process DOE finds them necessary and appropriate.

For the UMTRA Ground Water Project, institutional controls would reduce exposure to or reduce health risks by (1) preventing inappropriate intrusion into contaminated ground water or (2) restricting access to or use of contaminated ground water for unacceptable purposes (domestic-household use).

The EPA standards require that institutional controls

- Have a high degree of permanence.
- Protect public health and the environment.
- Satisfy beneficial uses of ground water.
- Are enforceable by administrative or judicial branches of government entities.
- Can be effectively maintained and verified.

EPA recognizes that a combination of controls may be needed to protect public health and safety. Key to identifying, implementing, and enforcing institutional controls is participation by local and state governments in the development process. While DOE is responsible for compliance with the EPA standards at UMTRA Ground Water Project sites, its authority to implement and enforce institutional controls is limited. This is particularly true where ground water contamination from uranium processing may have moved beyond the mill-site to areas that are not within the DOE jurisdiction.

The need for, and the duration of, institutional controls depends on the compliance strategy selected for a site, the type and level of risk to humans and the environment, and existing site conditions. Movement of contaminated ground water may require restrictions for an extended period of time. As risks decrease over time, so should the need for institutional controls. Therefore, to ensure protection of human health and the environment and to satisfy requirements for beneficial uses of the water, it is important that the effectiveness of institutional controls be verified and modified as necessary.

Institutional controls are being developed to address the contamination associated with the Naturita site. These controls are being selected using input from the landowners, in conjunction with local, state, and Federal Government agencies. The final institutional controls selected for Naturita will need to be approved by the U.S. Nuclear Regulatory Commission.

Long-Term Surveillance and Maintenance

Once the compliance strategy has been finalized, it is the responsibility of DOE to ensure that the selected compliance strategy continues to be protective of human health and the environment. Ground water sites become part of the Long-Term Surveillance and Maintenance (LTSM) Program administered by the DOE Grand Junction Office. The LTSM Program manages the site according to a Long-Term Surveillance Plan prepared specifically for the Naturita site; activities will include ground water monitoring.

Documents Available

Instructions are available on the DOE Grand Junction Office Internet website at <http://www.gjo.doe.gov/ugw> to order a copy of the *Baseline Risk Assessment* for the Naturita site.

A draft *Environmental Assessment* has been prepared. The final document will be posted on the website when it is released.

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